



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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July 1, 1999

TO: File

THRU: Daron Haddock, Permit Supervisor *DH*

FROM: Paul Baker, Reclamation Biologist *PB*

RE: Revised Reclamation Plan, PacifiCorp, Deer Creek Mine, ACT/015/018-AM99C, Folder #2, Carbon County, Utah

SUMMARY:

On May 25, 1999, the Division received a proposal to revise the reclamation plan for the Deer Creek Mine. The revision was prompted primarily by the highwall survey and the requirement to eliminate pre-1978 highwalls to the extent feasible, and it was necessary for PacifiCorp to revise the backfilling and grading plan.

The Division has no record of receiving C-1 and C-2 forms with this amendment. The C-2 form would show where the pages of this submittal would be inserted in the plan. Although PacifiCorp's cover letter gives much of the information required in the C-2 form, it is not complete.

This review considers primarily the revegetation plan, but it also discusses the channel design as it relates to restoring the riparian area near the creek.

TECHNICAL ANALYSIS:

ADMINISTRATIVE INFORMATION

APPLICATION FORMAT AND CONTENTS

Regulatory Reference: R645-301-120

Analysis:

The Division has no record of receiving C-1 and C-2 forms with this submittal. There is no notarized statement from an official of the applicant that the information in the application is true and correct to the best of the official's information and belief.

The cover letter submitted with the amendment includes some of the information required in the C-2 form, but it does not show where to put much of the text. For example, the cover letter says pages 4-1 through 4-56 and 4-66 and 4-67 should be removed. This is most of the current reclamation plan. However, the letter does not show where to insert the new pages of the reclamation plan, and some page

numbers in the new reclamation plan overlap with page numbers in other sections of the current mining and reclamation plan. This could become very confusing and needs to be corrected.

Findings:

Information provided in the proposal is not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-121, The applicant did not provide instructions on how to insert some of the material in the application into the mining and reclamation plan. This needs to be done in such a way that page numbers correspond with adjacent portions of the plan and so page numbers are not duplicated.

R645-301-123, The Division has no record of receiving a C-1 form with the notarized signature of a responsible official of the applicant indicating the information in the application is true and correct to the best of the official's information and belief.

RECLAMATION PLAN

REVEGETATION PLAN

Regulatory Reference: R645-301-341

Analysis:

Revegetation and Monitoring Schedules

Table 3-1 shows the timing of various steps in reclamation, and Table 3-2 is a schedule of monitoring activities. Under the reclamation schedule, seedbed preparation, fertilization, and seeding and planting would be done in early April or in late July through September.

The applicant needs to clarify this schedule and show compliance with R645-301-354. Mid-summer seeding or planting should be avoided. The normal time for seeding in Utah is as late in the fall as possible. Planting bare root stock, cuttings, or rooted cuttings needs to be done in early spring, and containerized plants can be planted in early spring or in the fall. Early spring seeding is sometimes successful but should also be avoided.

The application is not required to have a revegetation monitoring schedule, but the schedule shown is not adequate for showing revegetation success for bond release. Under R645-301-356.232, 80% of trees and shrubs counted toward the woody plant success standard must have been in place for at least 60% of the extended liability period, and all woody plants counted toward the standard must have been in place for at least two years. This requirement necessitates that woody plants be counted in the fourth and eighth years after seeding and planting. In addition, the success standards for vegetation cover must be met for at least two years; therefore, it is necessary to take cover measurements in both the

ninth and tenth years.

Surface Preparation Techniques

Sections 240 and 340 discuss soil redistribution and surface preparation. As areas are recontoured and topsoil is distributed, they will be roughened by discontinuous tilling and/or deep gouging with a trackhoe bucket or similar equipment. Where feasible or helpful to prevent slope slippage, rocks and boulders will be randomly placed on slopes. These methods are designed to control slope slippage, reduce runoff and erosion, promote microhabitats, and provide a more aesthetically-pleasing appearance. Where deemed necessary, especially on slopes greater than 20%, a soil tactifier will be incorporated.

In section 340, the application says certified fertilizer will be applied and weed free alfalfa hay will be incorporated into the soil following contouring. Pocking will mix the straw mulch and fertilizer into the upper portion of the soil.

The applicant needs to clarify these sections. Discontinuous tillage is described in at least one text as being done with a notched disc, but it is not certain whether this is what the applicant intends. It is uncertain what a soil "tactifier" is, how it would be used, and whether it would be beneficial for erosion control and vegetation establishment.. While the application describes incorporating hay into the soil, it also mentions using straw. If hay is mixed into the soil, it is more properly referred to as a soil amendment rather than as mulch which is usually on the surface. In addition, while the application says certified weed free hay would be used, the applicant is probably referring to certified *noxious* weed free hay.

Seeding and Planting Mixtures and Revegetation Methods

The applicant has revised the three seed mixes in the mining and reclamation plan. Every species in the mixtures is native to the area, and the mixtures are diverse and should lead to vegetation stands that comply with the revegetation performance standards. However, the Division has a few suggestions to improve diversity.

In riparian areas, Wood's rose would be planted at the rate of 500 per acre within 20 feet of the stream. The most common woody species in the riparian area was Rocky Mountain maple followed by Wood's rose and red osier dogwood. It is suggested the applicant reduce the number of Wood's rose plants to 200 per acre and add Rocky Mountain maple at the rate of 300 per acre.

Bluebunch wheatgrass, although a native species, is sometimes aggressive, and it tends to exclude other species. For this reason, it is suggested the amount seeded be reduced to one or two pounds of pure live seed per acre.

The applicant is required by R645-301-358.400 to enhance where practicable, restore, or replace, wetlands and riparian vegetation along rivers and streams and bordering ponds and lakes. Since these areas are considered habitat of unusually high value, the applicant needs to use the best technology currently available to achieve these goals. Deer Creek above and below the mine supports a riparian community that needs to be restored as far as possible. The seed and planting mix contains many of the

species assumed to have been in the riparian area before disturbance as shown in Table 6, page 2-156, of the current mining and reclamation plan. Many of the species in the seed and planting mix are upland species, but there are other species in the mix that would grow strictly in areas with enhanced moisture availability.

The *Interagency Forage and Conservation Planting Guide for Utah* indicates forbs do not normally need to be planted in riparian areas because, with proper management, they will come in on their own. Some forbs have been included in the seed mix, but these are species that would normally grow in more xeric upland sites rather than true riparian areas. It is anticipated that seeds of sedges, rushes, broadleaf forbs, and other plants would be washed into the riparian area from areas above the mine.

The applicant has designed riprap-lined channels for the entire length of the mine. At the confluences of Deer Creek with the channels from Deer and Elk Canyons, small pools would be built that could hold water and become small wetlands. Riprap-lined channels are not as conducive to vegetation growth and establishment as those designed using soft armoring or bioengineering. Certain parts of the channels likely need to be riprapped, but it would probably be feasible to use other designs in less steep areas, such as the one where the grade is about 2%. The applicant needs to investigate these design options. This is discussed further in the section of this analysis concerning hydrologic designs.

The applicant has committed to specific spacing for willows, dogwoods, and cottonwoods. In the Division's experience, there are not always enough places to plant along a restored stream during the first year after reclamation. Depending on the reclamation methods used, it may be necessary to allow bars to build up in the stream before some of the plants can be planted. Also, the spacing is usually not very even in situations like this, and the applicant may want to add a statement indicating the plants may not be all planted at the same time and that the spacing may not be regular.

The seed mixtures will be broadcast seeded using a hurricane-type seeder or with a hydroseeder. If the seed is hydroseeded, a small amount of wood fiber mulch will be added to mark the coverage area. Otherwise, the areas will be raked to cover the seeds. Either of these methods is acceptable.

Finally, a wood fiber or other acceptable mulch will be applied at the rate of about 2000 pounds per acre. Using a wood fiber mulch is acceptable, but other mulching methods have proven to be more durable and to provide better erosion protection. At other coal mines, the best results have come with using about one ton per acre of certified noxious free straw mulch followed by application of a tackifier and about 500 pounds of wood fiber mulch. The tackifier and wood fiber mulch bind the straw and help keep it from blowing away. Straw does not decompose as quickly as the wood fiber mulch.

The application does not discuss irrigation, so it is assumed the reclaimed area will not be irrigated. Rodent control measures will be implemented as necessary. Weed control will not be done unless it is necessary, but all noxious weeds will be eradicated if they become established on the site. The Division does not anticipate that irrigation or pest control will be needed except for noxious weeds. The husbandry practices in R645-301-357 allow control of noxious weeds through the entire extended liability period.

The application says rills and gullies will be filled and the soil reseeded. For repaired areas

larger than 15% of the total reclaimed area, the Division will be notified and the affected area will be reported in the annual report. Repairs and seeding of up to 15% of the area is allowed for the first two years of the responsibility period without restarting it. After two years, seeding this large of an area would increase the length of the extended liability period. This is not considered a deficiency in the application, but the applicant needs to be aware of the potential problem.

Revegetation Success Standards

The plan contains information about three reference areas that will be used as revegetation success standards. It appears from the data and comparisons in the plan that these reference areas are acceptable.

The Division is required to consult with the Division of Wildlife Resources about woody plant density success standards. In many cases, the numbers of woody plants in reference areas are not ideal for the type of habitat sought. When measured in 1980, the mixed conifer, pinyon juniper, and riparian reference areas had 3320, 584, and 3412 woody plants per acre, respectively. These are considered acceptable standards for these areas.

The applicant has two options for setting the woody plant density standards: 1) The applicant can use the specific numbers shown above, or, 2) The number of woody plants in the reference areas can be measured at the time of final reclamation. With the second option, the measured density values would need to be approved by the Division and Wildlife Resources. The application needs to specifically discuss the woody plant density standard and show what this standard is or how it will be obtained.

The application does not discuss success standards for other general revegetation requirements in R645-301-353. In particular, it should say how diversity and erosion control will be measured and what standards will be used. Without approved standards in the plan and without methods of measuring these parameters, it becomes very difficult to decide whether success has been achieved.

Seasonality of established plant species is an important issue at some mines, but most or all of the species encountered in the vegetation sampling at Deer Creek were cool season species. These are generally much easier to establish than warm season species, so seasonality should not be a concern. To achieve revegetation success, essentially all of the species in the reclaimed area should be cool-season.

The other requirements in R645-301-353 would be very difficult to measure quantitatively, so a qualitative analysis at the time the applicant is seeking bond release is most appropriate.

Fish and Wildlife Habitat

The seed mixture in the application are acceptable for providing proper habitat conditions for wildlife.

According to the application, development of enhanced wildlife habitat is accomplished by constructing pools along portions of the Deer Creek drainage, and pools will be placed at the confluences of the drainages from Deer and Elk Canyons with Deer Creek.

Deer Creek Reclamation Plan

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No other enhancement measures are discussed in this section of the application, but the application says rocks and boulders would be placed on the surface. This enhancement method has been used successfully at other mines to create habitat for birds and small mammals.

The application discusses possible water discharge from the portal after reclamation, and it is not known what the flow or chemistry of this discharge would be or what effects it would have on organisms in Deer and Huntington Creeks. The macroinvertebrate study conducted in 1991 and in 1994 should be repeated in Deer Creek and Huntington Creek in the spring and fall the year before reclamation, in the fifth year after reclamation, and in the last year of the extended liability period just before applying for final bond release. This monitoring will allow assessment of whether fisheries are adversely affected.

Findings:

Information provided in the proposal is not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-341.100, The applicant needs to clarify the reclamation schedule to show compliance with R645-301-354.

R645-301-341, The applicant needs to clarify the sections of the application dealing with surface preparation.

R645-301-341, R645-301-358, The applicant must show how it will use the best technology currently available to restore or replace riparian vegetation. The applicant has designed riprap-lined channels for the entire length of the mine, but riprap-lined channels are not as conducive to vegetation growth and establishment as those designed using soft armoring or bioengineering. Certain parts of the channels presumably need to be riprapped, but it would probably be feasible to use other designs in less steep areas, such as the one where the grade is about 2%. The applicant needs to investigate these design options.

R645-301-341.250, The application needs to discuss density standards for woody plants. For these standards, the applicant could use either the density values shown in the current mining and reclamation plan or could commit to use the values obtained when sampling for bond release. In the latter case, it would be necessary to obtain specific Division and Wildlife Resources approval for the new standard.

R645-301-250, The application does not discuss success standards for some of the general revegetation requirements in R645-301-353. In particular, it should discuss how diversity and erosion control will be measured and what standards will be used.

R645-301-342, The macroinvertebrate study conducted in 1991 and in 1994 needs to be repeated in Deer Creek and Huntington Creek in the spring and fall the year before reclamation, in the fifth year after reclamation, and in the last year of the extended liability period just before applying for final bond release.

In addition to these requirements, the Division has several suggestions for the reclamation plan:

1. The application is not required to have a revegetation monitoring schedule, but the schedule shown is not adequate for showing revegetation success for bond release. Woody plant density needs to be measured in the fourth and eighth years following seeding, and vegetation cover needs to be measured in the ninth and tenth years.
2. A very effective mulching technique at other mines in Utah has been to apply about one ton per acre of straw followed by application of a tackifier and 500 pounds per acre of wood fiber hydromulch.
3. It is suggested the applicant reduce the number of Wood's rose plants to be planted in the riparian area to 200 per acre and add Rocky Mountain maple at the rate of 300 per acre.
4. Bluebunch wheatgrass, although a native species, is sometimes aggressive, and it tends to exclude other species. For this reason, it is suggested the amount seeded be reduced to one or two pounds of pure live seed per acre.

LAND USE RECLAMATION PLAN

Regulatory Reference: R645-301-412

Analysis:

According to Section 412 of the application, the postmining land uses will be grazing and wildlife habitat, and these are the same as the premining land uses. Both the Forest Service and Bureau of Land Management have indicated no foreseeable changes to this use, and the area is zoned by the county for grazing, mining, and recreation.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

RECOMMENDATIONS:

The application should not be approved until the deficiencies discussed in this memorandum have been adequately addressed.